

farming operations in bottom lands were delayed till the 27th. At Cairo, Ill., the river passed below the flood stage on the night of the 12th-13th, and the work of removing débris and restoring conditions to their former state had not been completed on June 6.

#### MISCELLANEOUS.

Southwesterly winds prevailed over most of the district. The highest velocity reported was 48 miles an hour from the northeast on the 11th, at Madison, Wis. The average number of clear days was 13; partly cloudy, 10; cloudy, 8. The percentage of sunshine for the district was close to the normal. Over the region of heavy rainfall it was somewhat deficient.

#### THE EFFECT OF THE TIME OF OBSERVATION ON MEAN TEMPERATURES.

By C. A. DONNEL, Observer, Des Moines, Iowa.

Doubtless the subject of this item has already attracted the attention of many students and investigators. It was first brought to the writer's notice in connection with the computation of weekly mean temperatures for telegraphic transmission to the central office on Monday mornings during the crop season, the means being derived from the highest and lowest daily temperatures for the 24-hour period ending at 8 a. m., 75th meridian time. It was noted that in all instances the means computed in this manner were somewhat lower than those derived from the highest and lowest daily temperatures for the 24-hour period ending at 12 o'clock midnight of the standard of time in local use. The reason for this difference will, of course, be obvious upon reflection, as will the further fact that the difference will reach a maximum when the mean temperatures are derived from readings of the maximum and minimum thermometers which cover the 24-hour period ending at the coolest time of the day. At the close of the crop season in 1911 it was found that at Des Moines, Iowa, the average daily departure of the mean temperature from the normal for the season, March 1 to September 30, inclusive, was  $+2.1^{\circ}$ , the mean temperatures having been derived from the highest and lowest daily temperatures for the period ending at 8 a. m., 75th meridian time, but that the departure, with the mean temperatures derived from the highest and lowest daily temperatures for the period ending at 12 o'clock midnight, was  $+2.7^{\circ}$ .

This subject was also brought to notice in a second way. In tracing the mean monthly isotherms for the Iowa Monthly Climatological Report it was observed that at several points on the map the lines showed a distortion which could not be accounted for by differences

of topography, exposure of instruments, or in any other manner. It was soon noted, however, that the points where the distortions occurred were the locations of the corn and wheat region stations, where the observations for the highest and lowest temperatures are taken early in the morning and not at the time common with most cooperative observers, which is at or about sunset. To show that the differences pointed out do actually result from unlike hours of observation a computation has been made of the monthly mean maximum, mean minimum and mean temperatures for the Des Moines, Iowa, station for the year 1911, these means being derived from observations taken both at 8 a. m. and at 8 p. m., 75th meridian time. These values, together with the mean temperatures derived from the highest and lowest daily temperatures for the period ending at 12 o'clock midnight, standard of time in local use, which corresponds with 1 a. m., 75th meridian time, appear in the table herewith:

*Mean temperatures at Des Moines, Iowa, for 1911.*

Month.	Observations taken at 8 a. m.			Observations taken at 8 p. m.			Observations taken at 12 midnight.		
	Mean maximum.	Mean minimum.	Mean monthly.	Mean maximum.	Mean minimum.	Mean monthly.	Mean maximum.	Mean minimum.	Mean monthly.
January.....	31.8	11.1	21.4	33.8	13.8	23.8	31.6	11.7	21.6
February.....	36.5	19.8	28.2	37.6	22.7	30.2	36.7	21.5	29.1
March.....	50.8	27.2	39.0	53.5	30.8	42.2	51.2	30.0	40.6
April.....	57.2	38.2	47.7	58.5	39.9	49.2	57.6	39.6	48.6
May.....	76.5	54.4	65.4	77.8	56.0	66.9	76.6	55.2	65.9
June.....	89.1	65.3	77.2	90.6	66.0	78.3	89.1	65.9	77.5
July.....	88.9	65.3	77.1	89.4	66.0	77.7	88.9	65.5	77.2
August.....	84.5	62.3	73.4	85.9	63.4	74.6	84.6	63.1	73.8
September.....	76.9	55.9	66.4	79.0	57.8	68.4	76.9	57.2	67.0
October.....	58.6	41.4	50.0	59.2	43.0	51.1	58.5	42.6	50.6
November.....	40.0	21.9	31.0	42.2	24.8	33.5	40.9	23.7	32.2
December.....	36.1	20.8	28.4	37.3	23.8	30.6	36.3	22.2	29.3
Year.....	60.6	40.3	50.4	62.1	42.3	52.2	60.7	41.5	51.1

It is seen that the mean annual temperature is  $0.7^{\circ}$  lower when the observations are taken at 8 a. m. and  $1.1^{\circ}$  higher when taken at 8 p. m. than the mean based on observations taken at 12 o'clock midnight. The differences in the monthly means are least in summer and greatest in winter, which should be the case since both maximum and minimum temperatures occur more irregularly in the day in the winter season than in the summer season.

A study of the data presented herewith would seem to indicate the danger of trying to compare temperature conditions between stations when the hours of observation are not simultaneous or nearly so.